FUTURE FISHERIES IMPROVEMENT PROGRAM
GRANT APPLICATION
(please fill in the highlighted areas)

I. APPLICANT INFORMATION

A. Applicant Name: Jim Olsen

B. Mailing Address: 1820 Meadowlark Lane

C. City: Butte State: MT Zip: 59701

Telephone: 533-8451

D. Contact Person: Same as above

Address if different from Applicant:

City: State: Zip:

Telephone:

E. Landowner and/or Lessee Name (if other than Applicant): John Sampson

Mailing Address: 2487 Hwy 287

City: Sheridan State: Mt Zip: 59749

Telephone: 406-596-1305

II. PROJECT INFORMATION*

A. Project Name: Smith Slough Spawning Enhancements

River, stream, or lake: Smith Slough

Location: Township 4S Range 6W Section 6

County: Madison

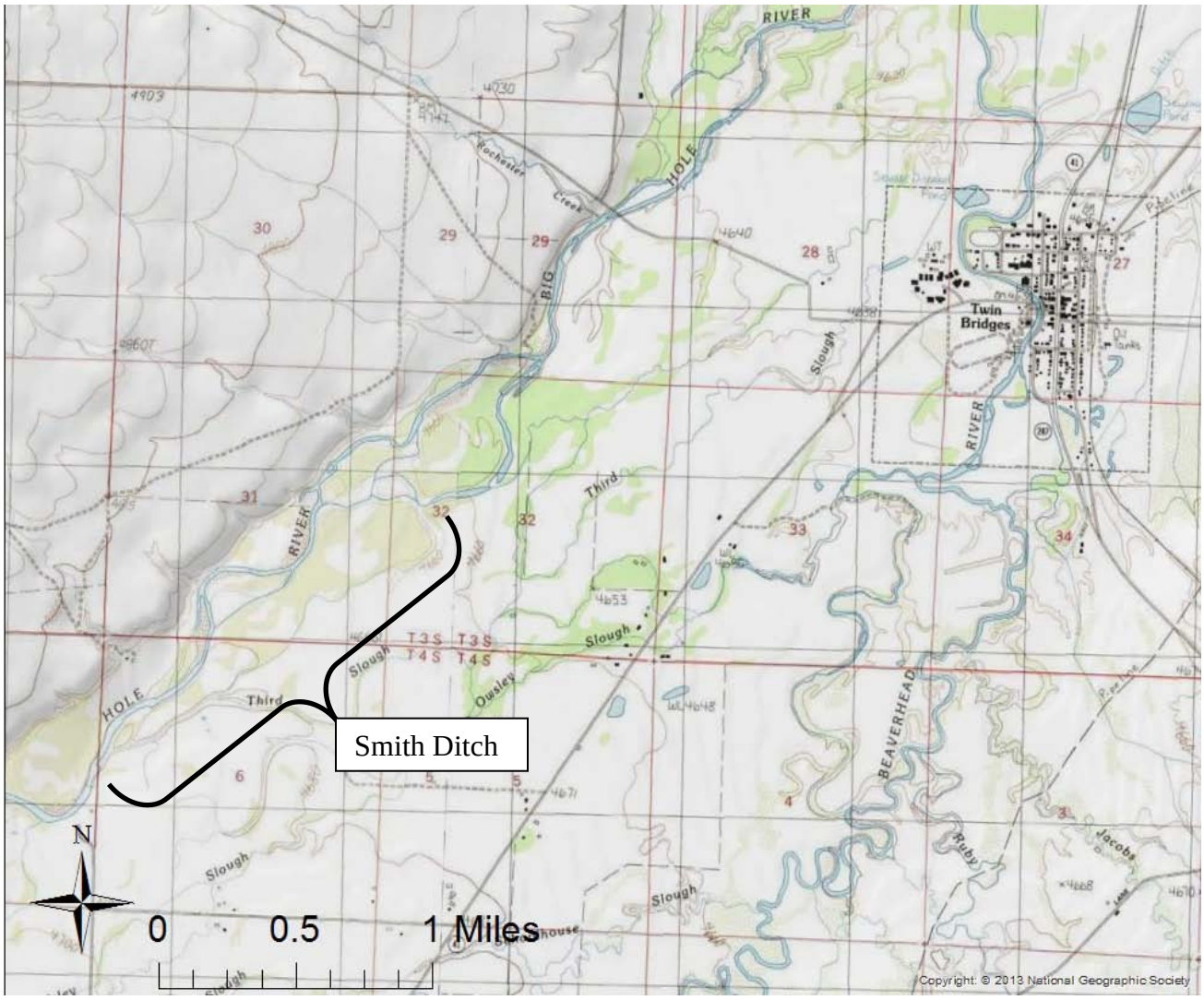
B. Purpose of Project:

Enhance existing slough to provide spawning and rearing habitat, reduces summer temperature and improve adult habitat.

C. Brief Project Description

The project reach is approximately 3.5 miles southwest of Twin Bridges, Montana, and includes a 2-mile long slough channel of the Big Hole River called the Smith Slough and a 1-mile segment of the Smith Ditch. Downstream of the diversion from the headgate the ditch/slough

system is split in half using a pin and plank control structure. This structure divides the water between the slough to the west and the ditch to the east. The two channels flow parallel for more than a mile before converging and discharging back to the Big Hole River. The slough channel and ditch channel both flow through old meander braids of the Big Hole River. The ditch system to the east is above the normal floodplain of the river whereas the lower ½ of the slough is influenced by over-bank flows from the Big Hole River during flood events. Because the slough channel, particularly the lower ½ of the channel, is influenced by high flows from the river the channel is over widened and shallow during normal low flows. The shallow nature of the channel results in fine sediment deposition and increased exposure to thermal radiation and warming of the water before it returns to the Big Hole River. The slough also discharges to the Big Hole River through a backwatered oxbow of the river which is very wide and shallow. There is some ground water influence in the slough channel as several surface springs are present that discharge directly to the channel. The purpose of the Smith Slough Fisheries Enhancement Project is to improve wild brown and rainbow trout spawning, improve habitat adult fish, improve water quality and improve water quantity in the slough and the Big Hole River. The trout numbers in the lower Big Hole River are substantially less than those 20 miles upstream (2164 trout > 8 inches/mile at river mile 22 versus 789 at river mile 6 within the propose project area). The cause for the reduced trout abundance is low flows during dry year, high water temperatures in the summer and a lack of suitable spawning and rearing habitat.



Spawning Habitat. The lower 22 miles of the Big Hole River lacks any tributary streams that could be used for spawning and rearing. Further, frequent bank stabilization projects completed in the lower reaches of the river have resulted in less braiding and side channel development than in reaches of river upstream. Many of these side channel areas of the river contain spawning habitat for brown and rainbow trout. FWP has identified the fishery in the lower river as limited in part by available spawning habitat (Big Hole River Fisheries Management Plan, 1988). The enhancements planned in the slough channel will add approximately 1,600 ft of high quality spawning areas that will be self-maintaining through time. The Smith Ditch/ Slough Channel splits into two separate systems approximately 1,500 ft downstream of the headgate. The Slough Channel and the Smith Ditch parallel each other for over a mile before rejoining and flowing back to the Big Hole River. The Smith Ditch portion of the channel (eastern channel) will be used as the spawning channel because this channel is not affected by periodic high river flows. When the Big Hole over tops its banks a portion of the river flows end up in the slough channel which would potentially scour away imported smaller gravels. The Smith Ditch, on the other hand, is not affected by high river flows making it the better candidate for spawning enhancemnts. While the Smith Ditch is technically a ditch, it flows through a historic braid of the Big Hole River and therefore has characteristics of a stream channel rather than a ditch. The channel meanders back and forth with typical riffle pool sequences. However, there is very little spawning habitat present in the Smith Ditch channel because it was formed by the Big Hole River whose substrate is primarily softball sized and larger cobble which is too large for trout spawning. Trout select spawning gravels that are typically 1.5-2.0 inches in diameter to construct redds. We plan on constructing 1,600 ft of spawning areas in the Smith Ditch channel. This habitat would be constructed by excavating existing sediments in areas that have appropriate depth and velocity and replacing the excavated sediment with appropriately sized spawning substrate. These spawning areas have been identified in the attached design. Adult fish habitat would not be emphasized in the ditch channel to reduce the potential for increased brown trout predation on juvenile fish. Pools will be relatively shallow and will contain juvenile habitat such as partially submerged brush piles. Once the spawning habitat work is completed, a water management plan will be enacted to manage flows in the Smith Ditch channel to flush fine sediment from the spawning gravels which will maintain the habitat through time. FWP will collect and fertilized eggs from trout in the Big Hole River and incubate the eggs in the spawning channel to jump start the fishery. By doing this it is expected that the juvenile trout produced will migrate to the river to grow and once they reach maturity they will return to the channel to spawn.

Adult Fisheries. The other significant factor affecting the fishery in the lower Big Hole River is water quantity, particularly in drought years. Low flows in the river result in loss of aquatic habitat and high water temperatures. Restricted and poor quality habitat may cause fish to seek other habitats where conditions are better. It is hoped that improving adult fish habitat in the Smith Slough will provide a local refuge for adult fish when conditions in the river are suboptimal. In order to improve adult trout habitat in the Smith Slough system over-widened sections of the slough/ditch system will be narrowed and deepened. Approximately 4,300 ft of stream channel have been identified as being over-widened and in need of restoration in the slough system. To narrow the channel gravels would be excavated from the exiting stream bed and placed on the banks. Riffle pool sequences will be established according to the engineer's specifications. Native sod mats harvested from nearby sources would be placed on the gravel to form a natural bank. Willow cuttings or mature willow transplants would also be placed on the

newly formed bank. This technique creates nearly instant bank stability and cover for fish. The deeper narrower habitat will greatly enhance adult fish habitat. It will also have a secondary effect of buffering high water temperatures. A wide and shallow channel is exposed to increased solar radiation and convectional heat transfer. This results in warmer water temperatures during warm summer months. Restoring an appropriate width to depth ratio in the channel and planting riparian vegetation will provide shade and will aid in reducing thermal loading to the stream.

Water Quality. The objectives to improve water quality include the rerouting of irrigation return water to prevent its discharge to the slough system and eventually the Big Hole River. A significant amount of irrigation return water from flood irrigated fields upstream of the propose project area enter the Slough within 1,000 ft of the headgate. These warm and nutrient rich waters contribute thermal and nutrient loading to the slough system and eventually the Big Hole River. This project aims at rerouting these return flows around the slough and into an adjacent lateral ditch where the water can be used to irrigate adjoining pastures. Rerouting this return water will also require a minor reroute of the Smith Ditch (See Alternative 2 in attached design). Preventing these waters from entering the Smith Ditch and eventually the Big Hole River will reduce one substantial point source of thermal pollution to the slough and river.

Prior to returning to the Big Hole River the Smith Slough channel enters a wide and shallow oxbow bend of the river. Flows are backed up in this oxbow from the river and channel is wide and lacking significant water movement. Any thermal benefits of the slough channel narrowing upstream could be potentially lost before the water is discharged to the river. To mitigate this concern, the lower 700 feet of the slough channel will be relocated through a swale further west and a new channel will be constructed to deliver flows at base flows directly to the Big Hole River rather than through the existing wide and shallow oxbow.

Relocating the headgate structure from its current location on a maintained side channel of the Big Hole River to bank of the river itself would also result in improved water quality in the river (Alternative1b in attached design). Currently nearly annual maintenance is required to provide water to the Smith Ditch headgate. This maintenance involves the exaction of significant quantities of river gravel from river to create a flowing channel of water to the headgate. Relocating the headgate to the Big Hole River would reduce the probability of future maintenance in the form of excavation of stream gravels, which increase turbidity and degrade water quality, to maintain flows in the ditch.

Water Quantity. To improve water quantity in the slough and Big Hole River, the new landowners of the property the Smith Ditch services are currently converting from flood irrigation practices to a single pivot sprinkler system. The conversion of flood to sprinkler irrigation is expected to reduce irrigation demand from the Smith Ditch system from 15 cfs to 2.0 cfs, allowing for up to 13 cfs of water to remain in the Slough Channel and/or the Smith Ditch channels and eventually return directly to the Big Hole River. The location of the center pivot and pump is in the lower 1/3 of the slough channel and, therefore, the majority of the water savings will remain in the slough system through the end of the project. The pump for the sprinkler irrigation will draw water directly from the slough channel and will eliminate the need for more than 4,000 ft of conveyance ditch. This work was completed in the fall of 2014 and was funded solely by the private landowner and the associated costs of this conversion are not included in the project budget.

As previously mentioned, a water management plan would be developed as part of the final design of this project to balance flows between the slough and ditch channels so that habitat is maintained through time. This plan would require measuring devices which would be installed in the ditch. The Smith Ditch has a year round water right for stock purposes which will allow year-round diversion from the Big Hole River. Because of the water saving associated with the change from flood to sprinkler irrigation, a change of use application will be made to the DNRC to convert a portion of the irrigation water right to a fish and wildlife right to maintain adequate flows in the ditch and slough to support the fishery. It is anticipated that equal amounts of water would be dispersed to the both the ditch and slough (7.5 cfs) during normal flows. Flows could be diverted to either system to produce flushing flows to maintain habitat features.

A preliminary design has been completed for the fisheries and water quality enhancement work by Confluence Consulting Inc (see attached). The funds requested from the Future Fisheries Improvement program are primarily for the construction of the spawning channel in the Smith Ditch. I feel this has the most potential to benefit the fishery of the Big Hole River through increased recruitment of both brown and rainbow trout. Similar projects conducted on the Jefferson River which suffers from the same problems as the lower Big Hole River (low flows, high water temperature and a lack of spawning habitat), have had a significant positive impact on the fishery of that river and its resiliency through frequent droughts.

D. Length of stream or size of lake that will be treated: 6,950 ft

E. Project Budget:

Grant Request (Dollars): $ $50,000

Contribution by Applicant (Dollars): $ _____ In-kind $ _____
(salaries of government employees are not considered as matching contributions)

Contribution from other Sources (Dollars): $ **$152,495** In-kind $ **$190,000**
(attach verification - See page 2 budget template)

Total Project Cost: $ $392,495

F. Attach itemized (line item) budget – see template

G. Attach specific project plans, detailed sketches, plan views, photographs, maps, evidence of landowner consent, evidence of public support, and/or other information necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete supplemental questionnaire (fwp.mt.gov/habitat/futurefisheries/supplement2.doc).

H. Attach land management and maintenance plans that will ensure protection of the reclaimed area. Cattle grazing occurs currently on the ranch. The irrigated pastures are grazed in the fall and the river bottom area where the channels are located are grazed in the winter. However, going forward there will be no grazing the river bottom pasture.

III. PROJECT BENEFITS*

A. What species of fish will benefit from this project?:

Brown and rainbow trout

B. How will the project protect or enhance wild fish habitat?:

This project will enhance spawning habitat in the lower Big Hole River through the creation of 1,700 ft of spawning habitat in the Smith Ditch channel. The lower river is spawning limited which, in part, limits the number of trout in this section. Adult habitat will also be improved which will provide potential refuge for adult fish from the Big Hole River when conditions are poor due to low flows and high water temperatures. Because the slough originates from and discharges to the Big Hole River, fish will have unrestricted access to the slough to move back and forth.

C. Will the project improve fish populations and/or fishing? To what extent?:

The numbers of trout in the lower Big Hole River is approximately 1/3 those present only 20 miles upstream. Because of the lack of spawning habitat, it appears that many of the fish in the lower section of river are produced either upstream (mostly brown trout) or migrate from the Jefferson River (rainbow trout). Further, because of the low density and warmer water temperatures fish growth in the lower section of the river is much greater than farther upstream. Therefore, if more fish could be recruited to the lower river population locally it could greatly enhance the fishery in the river. Local recruitment could also buffer the large swings in population density in the lower river that occur when habitat conditions are poor (i.e., during droughts). Similar projects on the Jefferson River downstream have had dramatic effects on the fishery of that river.

D. Will the project increase public fishing opportunity for wild fish and, if so, how?:

This project will increase public fishing opportunity because the fishery could be significantly improved if there were a local source of spawning and recruitment to the river. It is possible that the fishery could double in the lower river. There are public fishing access sites and public bridges on the river both upstream and downstream of the project area that provide floater and foot access to the river.

E. If the project requires maintenance, what is your time commitment to this project?:

The only regular maintenance that is anticipated is following the flow management plan that will provide flushing flows to maintain habitat in both the spawning channel and the Smith Slough channel. The area where both channel exist will be excluded from cattle grazing. Grazing has only occurred in these pastures in the winter so there are few if any impacts to the slough channel or ditch channel from livestock grazing.

F. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?:

It is unknown if there was more spawning habitat available historically in the lower Big Hole River prior to the many bank stabilization projects in the area. There are no tributaries to the lower river that naturally flow year round. The proposed work will add 1,600 ft of spawning habitat to the lower Big Hole River. This habitat will be protected from high river flows and will be self maintaining by following the flow management plan. Spawning habitat is present in Smith Slough channel and some brown trout currently use it for spawning. The cause of the low water conditions and high water temperatures in the lower Big Hole River is irrigation withdrawal. Because this is the downstream extent of the drainage and because much of the water that is diverted from the lower Big Hole River irrigates land on the Beaverhead River floodplain and therefore discharges back to the Beaverhead rather than the Big Hole, flows can be limiting. Beginning in 2013, the Big Hole Watershed Committee expanded their drought management plan to include a new section of river from Notch Bottom (River mile 19) to the confluence with the Beaverhead River. This section has specific flow targets aimed at keeping minimum flows in the river to protect aquatic habitat and reduce the impacts of high water temperature. The drought management plan asks water users to voluntarily reduce irrigation withdrawals when flow trigger points are met. Following the plan is aiding in the awareness of water users of river flows and keeping more water in the river for fish.

G. What public benefits will be realized from this project?:

The public benefits of this project are an enhanced fishery in the lower Big Hole River through increased brown and rainbow trout spawning and recruitment. Increased production of juvenile fish will lead to increased production of adult fish in the mainstem river that will be accessible to anglers. The work will also provide refuge habitat in the slough when conditions in the mainstem river become suboptimal due to low flows and higher water temperature.

H. Will the project interfere with water or property rights of adjacent landowners? (explain):

No. The headgate structure is located on an adjacent landowner's property, but there is an existing easement that will allow for the relocation of the structure and channel work on this property. The remaining work in the channel will be done within the property of the cooperating landowner.

I. Will the project result in the development of commercial recreational use on the site?: (explain):

No. There is no commercial activity on the site.

J. Is this project associated with the reclamation of past mining activity?:

Yes.

Each approved project sponsor must enter into a written agreement with the Department specifying terms and duration of the project.

IV. AUTHORIZING STATEMENT

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature: _____ Date: _____

Sponsor (if applicable):

***Highlighted boxes will automatically expand.**

Mail To: **Montana Fish, Wildlife & Parks**
Habitat Protection Bureau
PO Box 200701
Helena, MT 59620-0701

Incomplete or late applications will be returned to applicant.

Applications may be rejected if this form is modified.

*****Applications may be submitted at anytime, but must be received by the Future Fisheries Program office in Helena before December 1 and June 1 of each year to be considered for the subsequent funding period.*****

WORK ITEMS (ITEMIZE BY CATEGORY)	NUMBER OF UNITS	UNIT DESCRIPTION*	COST/UNIT	TOTAL COST	CONTRIBUTIONS			
					FUTURE FISHERIES REQUEST	IN-KIND SERVICES	IN-KIND CASH	TOTAL
Personnel								
Survey				$ -				$ -
Design	1		$54,000.00	$ 54,000.00			54,000.00	$ 54,000.00
Engineering				$ -				$ -
Permitting	1		$8,000.00	$ 8,000.00			8,000.00	$ 8,000.00
Oversight				$ -				$ -
Labor	1	CD Overhaead	$7,000.00	$ 7,000.00			7,000.00	$ 7,000.00
Flow Mgt Plan	1		$3,000.00	$ 3,000.00			3,000.00	$ 3,000.00
Travel								
Mileage								$ -
Per diem								$ -
Construction Materials								
Smith Slough (Big Hole Side Channel Work)	1		$83,050.00	$ 83,050.00		*	83,050.00	$ 83,050.00
Smith Ditch Spawning	2000	CY gravel installed	$55.00	$ 110,000.00	50,000.00		60,000.00	$ 110,000.00
Alt 1b. Replace/relocate headgae and regrade ditch	1		$60,750.00	$ 60,750.00			60,750.00	$ 60,750.00
Alt 2. Redirecte irrigation return flows away from slough	1		$22,650.00	$ 22,650.00			22,650.00	$ 22,650.00
Alt 3. Lower channel realignment	1		$9,000.00	$ 9,000.00			9,000.00	$ 9,000.00
				$ -				$ -
Equipment								
				$ -				$ -
				$ -				$ -
				$ -				$ -
				$ -				$ -
Mobilization								
								$ -
								$ -
				$ -				$ -
Contingency (10%)	1		$35,045.00	$ 35,045.00			35,045.00	$ 35,045.00
				$ -				$ -
			TOTALS	$ 392,495.00	$ 50,000.00	$ -	$ 342,495.00	$ 392,495.00

* Landowner also will contribute all native sods, willows and other transplanted vegetation.

*Units = feet, hours, inches, lump sum, etc.

MATCHING CONTRIBUTIONS

CONTRIBUTOR	IN-KIND Material	CASH	TOTAL
Landowner Contribution	$ -	$ 190,000.00	$ 190,000.00
DEQ 319	$ -	$ 25,000.00	$ 25,000.00
FFIP	$ -	$ 50,000.00	$ 50,000.00
George Grant TU	$ -	$ 5,000.00	$ 5,000.00
RRGL (DNRC)		$ 125,000.00	$ 125,000.00
In-kind materials		$ -	$ -
WNTI	$ -		$ -
	$ -	$ -	$ -
Total	$ -	$ -	$ 395,000.00